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(54) **GASPER KNOB SANITIZATION**

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(57) **ABSTRACT**

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B64D 11/00 (2006.01)
B64D 13/06 (2006.01)

An air gasper knob system for an overhead Passenger Service Unit (PSU) includes an annular gasper knob of a UV transparent material. The annular gasper knob defines an air passage therethrough, and extends about the air passage from a first annular end face to a second annular end face. The system also includes a UV illuminator mounted to the gasper knob, oriented to transmit UV illumination through the UV transparent material to sanitize exterior surfaces of the gasper knob. A method of sanitizing an air gasper knob comprises illuminating a gasper knob in an overhead PSU using UV illumination to destroy infectious agents on surfaces of the gasper knob.

(52) **U.S. Cl.**

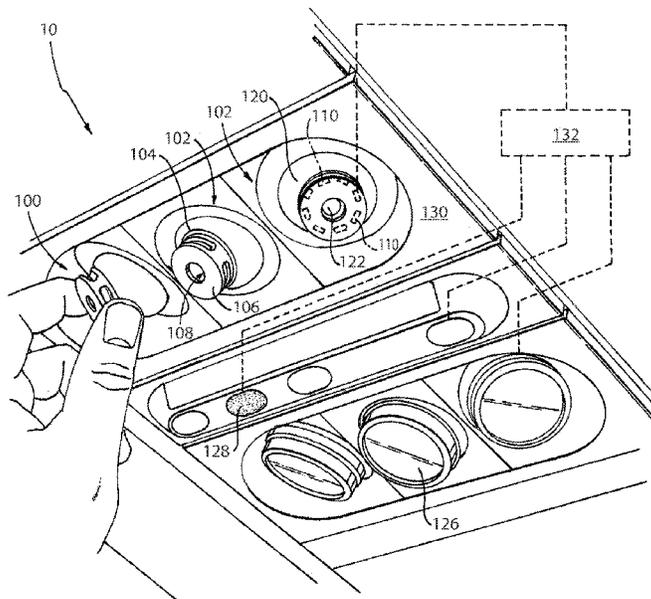
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(58) **Field of Classification Search**
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See application file for complete search history.

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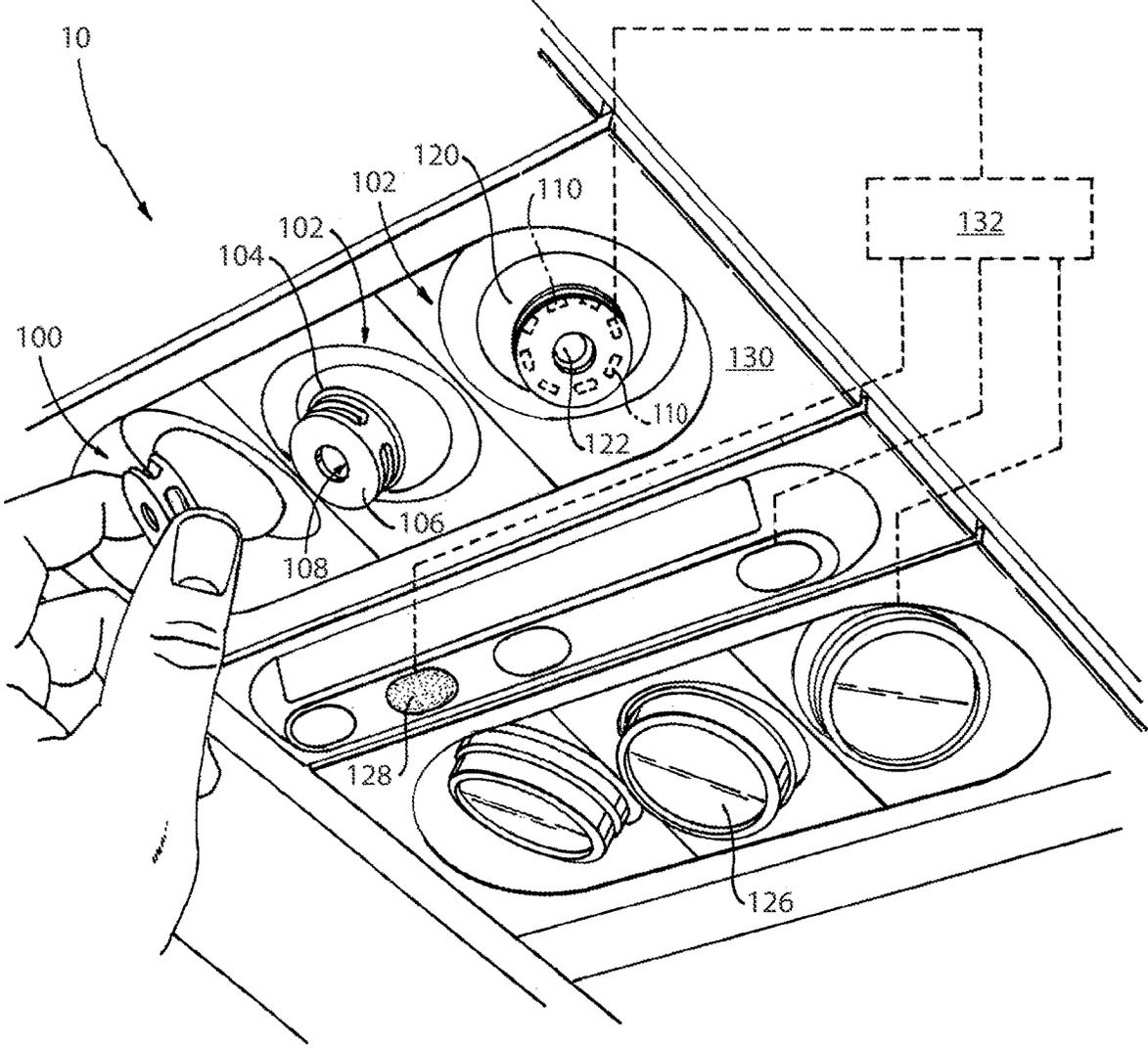


Fig. 1

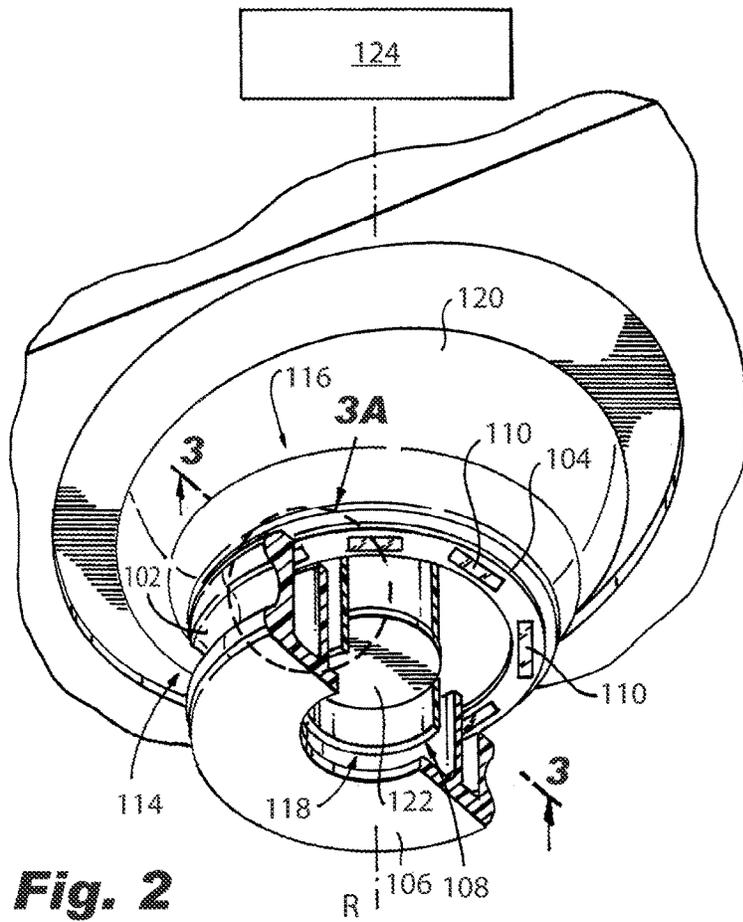


Fig. 2

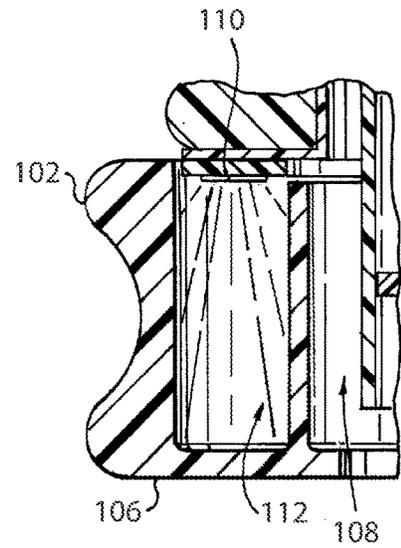


Fig. 3A

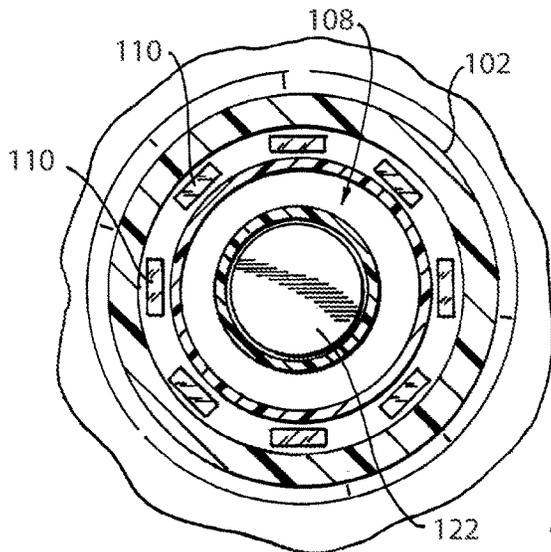


Fig. 3

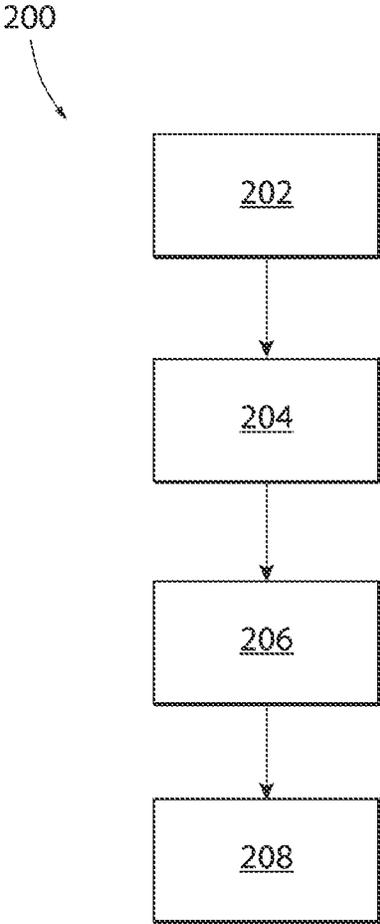


Fig. 4

GASPER KNOB SANITIZATION

RELATED APPLICATIONS

This application claims priority to and the benefit of Indian Patent Application No. IN202141004518, filed Feb. 2, 2021, which is incorporated herein by reference in its entirety.

BACKGROUND

1. Field

This invention relates to sanitization of aircraft interiors, and in particular sanitization of gasper knobs in aircraft interiors

2. Description of Related Art

The pandemic of 2020 has changed procedures and protocols for travel. While travel continues, and vaccines can be deployed to eventually control pandemics, it is clear that changes must be made to help prevent the spread of infection diseases. Aircraft interiors are the subject of scrutiny for how to reduce spread of contagions during flight from passenger to passenger, as well as between flights from one flight of passengers to the subsequent flight of passengers. Various schemes have been suggested and/or implemented, including spraying the passenger cabin with disinfectant sprays between flights.

While the current and traditional techniques have been considered sufficient for their intended purposes, there is an ongoing need for improvements to sanitizing aircraft interiors. This disclosure provides solutions to this need.

SUMMARY

An air gasper knob system for an overhead Passenger Service Unit (PSU) includes an annular gasper knob of a UV transparent material. The annular gasper knob defines an air passage therethrough, and extends about the air passage from a first annular end face to a second annular end face. The system also includes a UV illuminator mounted to the gasper knob, oriented to transmit UV illumination through the UV transparent material to sanitize exterior surfaces of the gasper knob.

The UV illuminator can be embedded in the gasper knob and can include a light emitting diode (LED) configured to emit UV illumination. The UV illuminator can be a strip of LEDs configured to emit UV illumination, and the strip of LEDs can be annular and embedded in the gasper knob proximate to the first annular end face of the gasper knob. The strip of LEDs can be embedded in the gasper knob so that the LEDs are oriented to illuminate toward the second annular end face of the gasper knob.

The system can also include a valve assembly configured to open and close a flow of air by turning the gasper knob about an axis of rotation. The first annular end face of the gasper knob can be at an inlet end of the gasper knob mounted to the valve assembly, and the second annular end face of the gasper knob can be at an outlet end of the gasper knob extending away from the nozzle assembly. The nozzle assembly can include a central cone configured to engage and disengage a rim in the valve assembly by turning of the gasper knob to control air flow through the gasper knob from a pressurized air source in fluid communication with the nozzle assembly.

The system can further include at least one reading light and/or at least one flight attendant call button mounted in a PSU panel with the nozzle assembly. The at least one reading light and/or at least one flight attendant call button can be electrically connected to a source of electrical power, and the LEDs can be electrically connected to the source of electrical power. The gasper knob can be one of a plurality of gasper knobs each having a respective illuminator electrically connected to the source of electrical power.

A method of sanitizing an air gasper knob comprises illuminating a gasper knob in an overhead PSU using UV illumination to destroy infectious agents on surfaces of the gasper knob. Illuminating the gasper knob can include illuminating all exposed surfaces of the gasper knob. Illuminating the gasper knob can also include using a UV illuminator embedded in the gasper knob.

The method can include powering the illuminator with a supply of electrical power within the PSU. The method can also include illuminating the UV illuminator after passengers have disembarked the aircraft cabin. The method can further include deactivating the illuminator prior to passengers boarding the aircraft cabin.

These and other features of the systems and methods of the subject disclosure will become more readily apparent to those skilled in the art from the following detailed description taken in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

So that those skilled in the art to which the subject disclosure appertains will readily understand how to make and use the devices and methods of the subject disclosure without undue experimentation, embodiments thereof will be described in detail herein below with reference to certain figures, wherein:

FIG. 1 is a schematic perspective view of an embodiment of a passenger service unit constructed in accordance with the present disclosure, showing a gasper knob;

FIG. 2 is a schematic perspective cross-sectional view of the gasper knob of FIG. 1;

FIG. 3 is a schematic cross sectional view of the gasper knob of FIGS. 1-2, looking upstream;

FIG. 3A is a schematic cross sectional view of the gasper knob showing an illuminator; and

FIG. 4 is schematic box diagram of a method.

DETAILED DESCRIPTION

Reference will now be made to the drawings wherein like reference numerals identify similar structural features or aspects of the subject disclosure. For purposes of explanation and illustration, and not limitation, a partial view of an embodiment of a system in accordance with the disclosure is shown in FIG. 1 and is designated generally by reference character **100**. Other embodiments of systems in accordance with the disclosure, or aspects thereof, are provided in FIGS. 2-4, as will be described. The systems and methods described herein can be used to sanitize gasper knobs.

An air gasper knob system **100** for an overhead Passenger Service Unit (PSU) **10** can include at least one annular gasper knob **102** of a UV transparent material, the knob **102** having a first annular end face **104** and a second annular end face **106**. The annular gasper knob **102** can define an air passage **108**, and can extend about the air passage **106**, for example from the first annular end face **104** to the second annular end face **106**.

The system **100** can also include a UV illuminator **110** mounted to the gasper knob **102**. For example, the UV illuminator **110** can include a light emitting diode (LED) configured to emit UV illumination **112** through the UV transparent material, or can include a strip of LEDs. The UV illuminator **110** can be oriented to sanitize exterior surfaces of the gasper knob **102**. For example, the UV illuminator **110** can be embedded (e.g. via additive manufacturing) in the gasper knob **102** and if the UV illuminator is a strip of LEDs, the strip can be annular and embedded in the gasper knob **102** proximate to the first annular end face **104** of the gasper knob **102**. In this configuration, the strip of LEDs can be embedded in the gasper knob so that the LEDs are oriented to illuminate toward the second annular end face **106** of the gasper knob **102**. Typically when sanitizing surfaces with UV illumination, surfaces of small components, such as gasper knobs **102**, might escape the UV rays line of sight and might not get effectively sanitized if UV illumination is applied to the cabin indiscriminately. By embedding the UV illuminator directly in the gasper knob **102**, such as described herein, effective sanitization of the gasper knob **102** can be achieved.

The system **100** can also include a valve assembly **114** configured to open and close a flow of air by turning (e.g. twisting) the gasper knob about an axis of rotation R. The first annular end face **104** can be at an inlet end **116** of the gasper knob **102** mounted to the valve assembly **114**, and the second annular end face **106** can be at an outlet end **118** of the gasper knob **102**, extending away from the nozzle assembly **114**. In embodiments, the nozzle assembly **114** can include a central cone **120** configured to engage and disengage a rim **122** in the valve assembly **114**. For example, the air flow through the gasper knob **102** can be controlled by turning the gasper knob **102**, where in the open position, air from a pressurized air source **124** can be fluid communication with the nozzle assembly **114**, and in the closed position, airflow from the pressurized source **124** can be restricted.

The system **100** can further include, for example in the PSU **10** at least one reading light **126** and/or at least one flight attendant call button **128** mounted in a PSU panel **130** with the nozzle assembly **114**. The reading light(s) **126** and call button(s) **128** can be electrically connected to a source of electrical power **132**, and the UV illuminator(s) **110** can be electrically connected to the same source of electrical power **132**. If the system **100** includes a plurality of gasper knobs **102**, each knob **102** can include its own UV illuminator **110**, and each UV illuminator **110** can also be electrically connected to the source of electrical power **132**.

A method **200** of sanitizing an air gasper knob (e.g. knob **102**) in a PSU **10** can include, at box **202**, illuminating a gasper knob **102** in an overhead PSU **110** using UV illumination (e.g. using illuminator **110**) to destroy infectious agents (e.g. bacteria and/or viruses) on surfaces of the gasper knob **102**. Illuminating **202** the gasper knob can include illuminating all exposed surfaces of the gasper knob **102**, for example all surfaces in which a passenger seated below the PSU **10** may interact with during the flight. This can be accomplished using embedded illuminators that transmit illumination through the gasper knob itself. During flight, a passenger typically adjusts the air flow rate through the gasper knob by adjusting it manually, as described above. Micro-organisms and other infectious agents present on the hands of a passenger may then transfer from the hand of the passenger to the external surface of the gasper knob and then to the air outlet. This can provide a pathway for microorganisms to spread inside the cabin through air coming from

the gasper outlet, in addition to a passenger in the next flight coming into contact with any microorganisms left behind.

The method **200** can include powering the illuminator **110** with a supply of electrical power within the PSU **10**, for example using source of electrical power **132**, as shown at box **204**. At box **206**, the method **200** can also include illuminating the UV illuminator **110** after passengers have disembarked the aircraft cabin. At box **208**, the method **200** can further include deactivating the illuminator **110** prior to passengers boarding the aircraft cabin, for example so passengers are not exposed to UV radiation from the UV illuminator **110**. The UV illuminators **110** can be connected so that they can be activated and deactivated by a non-passenger user (e.g. flight staff) using a single switch.

These and other features of the systems and methods of the subject disclosure will become more readily apparent to those skilled in the art from the following detailed description taken in conjunction with the drawings. The methods and systems of the present disclosure, as described above and shown in the drawings, provide for more efficient and effective sanitization of small aircraft components, such as gasper knobs and other equipment within a passenger service unit. While the apparatus and methods of the subject disclosure have been shown and described, those skilled in the art will readily appreciate that changes and/or modifications may be made thereto without departing from the scope of the subject disclosure.

What is claimed is:

1. An air gasper knob system for an overhead Passenger Service Unit (PSU), the system comprising:
 - an annular gasper knob of a UV transparent material, wherein the annular gasper knob defines an air passage therethrough, and where the annular gasper knob extends about the air passage from a first annular end face to a second annular end face; and
 - a UV illuminator mounted to the gasper knob, oriented to transmit UV illumination through the UV transparent material to sanitize exterior surfaces of the gasper knob.
2. The system as recited in claim 1, wherein the UV illuminator is embedded in the gasper knob.
3. The system as recited in claim 1, wherein the UV illuminator includes a light emitting diode (LED) configured to emit UV illumination.
4. The system as recited in claim 1, wherein the UV illuminator includes a strip of LEDs configured to emit UV illumination.
5. The system as recited in claim 4, wherein the strip of LEDs is annular and is embedded in the gasper knob proximate to the first annular end face of the gasper knob.
6. The system as recited in claim 5, wherein the strip of LEDs is embedded in the gasper knob with the LEDs oriented to illuminate toward the second annular end face of the gasper knob.
7. The system as recited in claim 6, further comprising a valve assembly configured to open and close a flow of air by turning the gasper knob about an axis of rotation, wherein the first annular end face of the gasper knob is at an inlet end of the gasper knob mounted to the valve assembly, and wherein the second annular end face of the gasper knob is at an outlet end of the gasper knob extending away from a nozzle assembly.
8. The system as recited in claim 7, wherein the nozzle assembly includes a central cone configured to engage and disengage a rim in the valve assembly by turning of the gasper knob to control air flow through the gasper knob from a pressurized air source in fluid communication with the nozzle assembly.

9. The system as recited in claim 8, further comprising at least one reading light and/or at least one flight attendant call button mounted in a PSU panel with the nozzle assembly, wherein the at least one reading light and/or at least one flight attendant call button are electrically connected to a source of electrical power, and wherein the LEDs are electrically connected to the source of electrical power. 5

10. The system as recited in claim 9, wherein the gasper knob is one of a plurality of gasper knobs each having a respective illuminator electrically connected to the source of electrical power. 10

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